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LUCANIA PARVA IN THE AQUARIUM

A case of spawning in the aquarium of *Lucania parva* has just come to the writer's attention and seems worthy of record.

This fish at times becomes very abundant among water weed in a fresh or very slightly brackish tributary of Moriches Bay at Mastic, Long Island. A number were captured here in September, 1914, since which date the writer has kept the species in balanced fresh-water aquaria continuously. From time to time the original stock has been added to by later collections or depleted by turning over fishes to other persons interested in keeping aquaria, so he can not say how long any one individual has lived in his tanks. There has been in general little mortality among them except wild fish immediately after having been placed in the tanks. They have been fed on dried food suitable for Poeciliid fishes. In the aquarium they usually do not show the dark cross marking characteristic of the fish when taken from its native haunt, but this marking has been assumed by fishes kept for several days in a tank where they swam among a thick growth of linear waterplant. One or two specimens have appeared in the writer's aquaria apparently smaller than any placed therein, from which he surmises that they must have done some spawning. Certainly no considerable number of young have been raised.

Lucania seems well adapted for the narrow confines of an aquarium on account of its small size. When several are placed in a tank they at first swim about in a more or less compact school, but when they become accustomed to their surroundings, scatter about the tank. They are moderately active and swim and take their food indifferently at the surface, at the bottom or in mid water. They have more poise than *Fundulus diaphanus* or *heteroclitus*, are less inclined to sluggishness or excitability. They show good spirit, frequently chasing one another, but are not bad fighters.

In February, 1916, Mr. J. Taubles of New York succeeded in getting spawn from four *Lucania parva*, recently obtained from the writer. On March 15, I visited his establishment and was shown several healthy-looking fry about $\frac{1}{4}$ in. in total length including caudal. They resembled the adults but were proportionately more slender with larger caudal fins. These he estimated to be three weeks old.

The fish had spawned and earlier fry hatched in a 14 x 9 x 9 inch tank placed in a window with water temperature fairly uniform at perhaps 64 degrees, and depth of water about 6 in. The tank had a good growth of water plants, much fine vegetation, plentiful algae. Although precise records had not been kept, I obtained the following opinion from those who had kept and cared for the fish. Younger fry than those referred to above hatched March 9 from spawn deposited on February 24, a period of just two weeks.

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FISH RECORDS FROM ORIENT, LONG ISLAND.

The following records refer to fishes taken near Orient, Long Island, New York. All the specimens referred to were collected by the writer and with the

exception of the *Siphostoma* have recently been identified at the American Museum of Natural History. Some of the species mentioned are common, but the dates of occurrence given are of interest.

Round Herring *Etrumeus sadina*. Of less regular occurrence than *Clupea harengus*, although more or less common every summer, May to October. It was unusually abundant in 1915, as many as ten barrels being taken in one lift of fishing pounds during June, July, August and September. It is called spearing and sardine, and not differentiated by some fishermen from the common herring.

Common Anchovy. *Stolephorus mitchilli*. A specimen 3 in. total length. Sound. Nov. 4, 1915.

Pipefish, *Siphostoma fuscum*. Two taken in Long Island Sound, March 1, 1916.

Northern Barracuda, *Sphyraena borealis*. A specimen 10 in. total length was taken in the Sound, November 6, 1915.

Scad. *Decapterus punctatus*. A specimen 5¾ in. total length. Sound. October 28.

Goggle-eyed Scad. *Trachurops crumenophthalmus*. A specimen 5¾ in. total length. Sound. October 18, 1915.

Big-eye. *Pricanthus arenatus*. Two specimens 3¼ and 4 in. total length. Sound. October 10 and 21, 1914. A few (all about this size) are taken every fall, September to November. The two specimens referred to have well developed preopercular spines.

Filefish. *Monacanthus hispidus*. A specimen 3½ in. total length. Sound. November 8, 1915.

Mitchill's Sculpin. *Myoxocephalus mitchilli*. A specimen 4½ in. total length. Bay. April 14, 1916.

Lump fish. *Cyclopterus lumpus*. A specimen two inches total length. Sound. October 25, 1914. We get a few of this species, usually about 3 in. long, every season, although it is never common.

Naked Goby. *Gobiosoma bosci*. A specimen 1¼ in. total length. Orient Bay. October 30, 1914.

Rock Eel. *Pholis gunnellus*. A specimen 3½ in. total length. Sound. November 15, 1915.

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[Mr. Latham's dried specimen identified as *Myoxocephalus mitchilli* differs from specimens of *aeneus* strikingly in color, being darker, the dark and white more contrasted, the fins more boldly marked. The ventral fins especially have three or four very bold black cross-bands, broader than the white interspaces, whereas in *aeneus* they are but faintly marked. The back seems to have been less elevated than in *aeneus* and the spinous dorsal is more elevated, especially posteriorly, its longest spines equal ½ head. Evidently this is the form described by De Kay as *mitchilli* (Cuvier & Valenciennes), (New York Fauna, Fishes 1842), and presumed *scorpio* (Mitchill) on which *mitchilli* (C. & V.) was based. It is the same as a specimen with 10 anal rays (No. 718 A. M. N. H.) which was probably supposed to be the young of the Daddy Sculpin, *groenlandicus*, as it is in the same jar with a specimen of that species from Casco Bay, Maine, both labelled *scorpiodes*! This latter specimen of *mitchilli* is in good preservation. It has the back little elevated and the spinous dorsal a little higher than any *aeneus* examined,—its longest spine not quite half head. The colors are like those of Mr. Latham's specimen. An *aeneus* 4¼ in., total length from Long Island with unusually high spinous dorsal has its longest spine 2.3 in head. No satisfactory structural difference, however, has been found between these two specimens of *mitchilli*, and *aeneus*. It is possible that recent authors are correct in synonymizing the forms but they look different.—*Ed.*]

RECORDS OF NORTHERN NEW JERSEY
FISHES.

Early in January, 1915, Prof. R. C. Osburn kindly forwarded me records of additions to the New York Aquarium obtained in New Jersey waters. These were derived from the notes of Mr. W. I. Denyse. I am indebted to both these gentlemen for the opportunity of presenting the greater part of the following list: The localities are Belford (b), Sandy Hook (s), from off Seabright to off Long Branch (o) in 6 to 17 fathoms. Butler (bu), Boonton (bo), Lake Weequahic (w). I am also indebted to Mr. C. F. Silvester for notes on fishes at Elberon (e), Manasquan (m), North Long Branch (n), Long Branch (l) and Princeton in the canal (c), and Stony Brook (p). *Petromyzon marinus* (b, p.), *Carcharias taurus* (b), *Mustelus mustelus* (s, o, l.), *Eulamia milberti* (b, o.), *E. obscurus* (l), *Sphyrna zygaena* (l), *Squalus acanthias* (o, l, e, m.), *Raja erinacea* (b, o, l.), *R. ocellata* (l), *R. eglanteria* (o), *R. laevis* (b, o, l.), *Narcobatus nobilianus* (s, one June, 1909), *Dasyatis centroura* (o), *Rhinoptera bonasus* (b, one October 13, 1912), *Acipenser sturio* (b), *Tarpan atlanticus* (b), *Dorosoma cepedianum* (c), *Pomolobus mediocris* (b), *P. pseudoharengus* (b), *Alosa sapidissima* (b), *Brevoortia tyrannus* (b), *Ameiurus nebulosus* (w), *Schilbeodes gyrinus* (p), *Abramis crysoleucas* (w, bu, bo.), *Notropis cornutus* (p), *Carassius auratus* (bu), *Catostomus commersonnii* (bo), *Erimyzon sucetta oblongus* (c, p.), *Esox americanus* (c), *E. reticulatus* (bu, Charlottesburg), *Fundulus majalis* (s, Shrewsbury River), *F. heteroclitus macrolepidotus* (s), *F. diaphanus* (Bay-shore), *Cyprinodon variegatus* (s), *Tylosurus marinus* (s), *Hyporhamphus unifasciatus* (s), *Syngnathus fuscus* (m), *Hippocampus hudsonius* (l, s, b.), *Mugil curema* (b?, s.), *Scomber scombrus* (e), *Sarda sarda* (l, m.), *Thunnus thynnus* (l, n.), *Scomberomorus maculatus* (l), *Trichiurus lepturus* (l), *Istio-*

phorus nigricans (n), *Seriola zonata* (l, o.), *Pomatomus saltatrix* (s, b, n.), *Trachinotus falcatus* (b), *Rachycentron canadum* (b), *Poronotus triacanthus* (e), *Aphredoderus sayanus* (c), *Lepomis auritus* (c, p.), *Pomotis gibbosus* (bu, bo, w, p.), *Microp-terus dolomieu*, (w, bo, Millstone River below Rocky Hill), *M. salmoides* (bo), *Perca flavescens* (bu, bo, c, p.), *Boleosoma nigrum olmstedii* (p), *Roccus lineatus* (b, l, Barnegat), *Morone americana* (s), *Centropristis striatus* (s, b.), *Stenotomus chrysops* (s, b.), *Lagodon rhomboides* (b), *Mullus auratus* (s), *Cynoscion regalis* (l, s, b.), *Bairdiella chrysura* (s), *Leiostomus xanthurus* (s, b.), *Micropogon undulatus* (b), *Menticirrhus saxatilis* (s, e.), *Pogonias cromis* (b), *Tautogolabrus adspersus* (b), *Tautoga onitis* (l, s, b.), *Balistes carolinensis* (o), *Alutera schoepfii* (s, b, n.), *Stephanolepis hispidus* (b, s.), *Lagocephalus laevigatus* (o), *Spheroides maculatus* (o, s, b.), *Chilomycterus schoepfi* (s, b.), *Myoxocephalus octodecimpinosus* (n, m, o.), *M. aeneus* (s, b.), *Prionotus evolans strigatus* (s, b, o.), *P. carolinus* (o, s, b.), *Paralichthys dentatus* (b, s, o, l.), *Pseudopleuronectes americanus* (s), *Achirus fasciatus* (b), *Leptecheneis naucratis* (b), *Opsanus tau* (s, b, l.), *Astroscopus guttatus* (s), *Enchelyopus anguillaris* (o), *Rissola marginata* (b), *Gadus callarias* (o), *Pollachius virens* (o), *Microgadus tomcod* (s), *Urophycis regius* (s, l.), *U. chuss* (o), *U. tenuis* (o), *Merluccius bilinearis* (b, l.), *Lophius piscatorius* (o, l.), *Leptocephalus conger* (l).

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BURROWING HABITS OF THE BOX TURTLE.

Dr. Overton's note in COPEIA No. 26 on "Aquatic Habits of the Box Turtle" (*Cistudo carolina*) recalls to the writer observations on Long Island, which indicate periods of aestivation for this species.

At Yaphank box turtles can always be found in considerable numbers during hot summer weather buried to a depth of from six to ten inches in the mud bordering a pool and several springs of a cranberry bog. On short visits to the region, usually two or three days, it could not be ascertained with certainty how long a time the turtles remain buried, yet that it must be for days, and, during prolonged droughts, probably for weeks appears certain, since in many cases observed the entry holes of the turtle burrows had been almost closed through sagging, followed by drying of the mud. From such burrows the turtles could not escape, except by breaking through the crust of mud at the top.

While the burrowing habit of the box turtle is commonplace and well-known, the gathering of such numbers of this species as witnessed by the writer and Mr. Wm. T. Davis during August, 1913, on Shelter Island, no doubt, is unusual. In a short, narrow ditch, partly filled with mud and water, we counted sixty, without disturbing the turtles, and there probably were as many more packed away in the mud. New arrivals were still coming in from the surrounding wood.

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THE BREEDING SEASON OF BUFO MARINUS (L) IN DEMERARA.

In a recent number of COPEIA (February 24, 1916) Mr. Austin H. Clark says of the breeding season of *Bufo agua* (*Bufo marinus* L.) "appears to breed about the commencement of the rainy season, somewhere in November or thereabouts," crediting this statement to Mr. Gilbert E. Bodkin, Government Economic Biologist of British Guiana.

The writer has no data on the habits of the species in Demerara, except for the months of July, August and September, but it should be recorded that

on the Demerara River, about thirty-five miles south of Georgetown, in 1914, tadpoles were abundant in July and August, and a lot taken during the last week in July reached the adult stage on and after August 16. From this the writer concludes that the eggs were laid about the first of July, and that in Demerara the species breeds in the long wet season, from the middle of April to September first. It is possible that it also breeds in the short wet season, which begins in November and lasts until the end of January, as stated by Bodkin, but, in the opinion of the writer, this has not as yet been established.

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WATER-SNAKES SWALLOWING FISH.

At Mastic, Long Island, on May 9, 1915, a small water-snake (*Tropidonotus*) was observed on the shore of Home Creek swallowing a large male *Fundulus heteroclitus*, of much greater caliber than itself. The fish was about half engulfed head first, its tail still flopping occasionally. When alarmed the snake took to the water, and when pinned to the bottom with a canoe paddle immediately relinquished the fish which swam away. Almost immediately after this snake was liberated a water-snake of the same size which seemed more strongly marked was seen in the water with a somewhat smaller male *Fundulus* which it had seized by the caudal fin. Getting a firm hold on the fish, which at times struggled violently, it swam ashore with it. The final swallowing took place slowly, tail first, the front end of the snake on the shore. Finally it was able to close its mouth with a gulp around the head of the fish which slipped back towards its middle. Comparatively little distorted by its meal the snake dived into the water and disappeared.

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